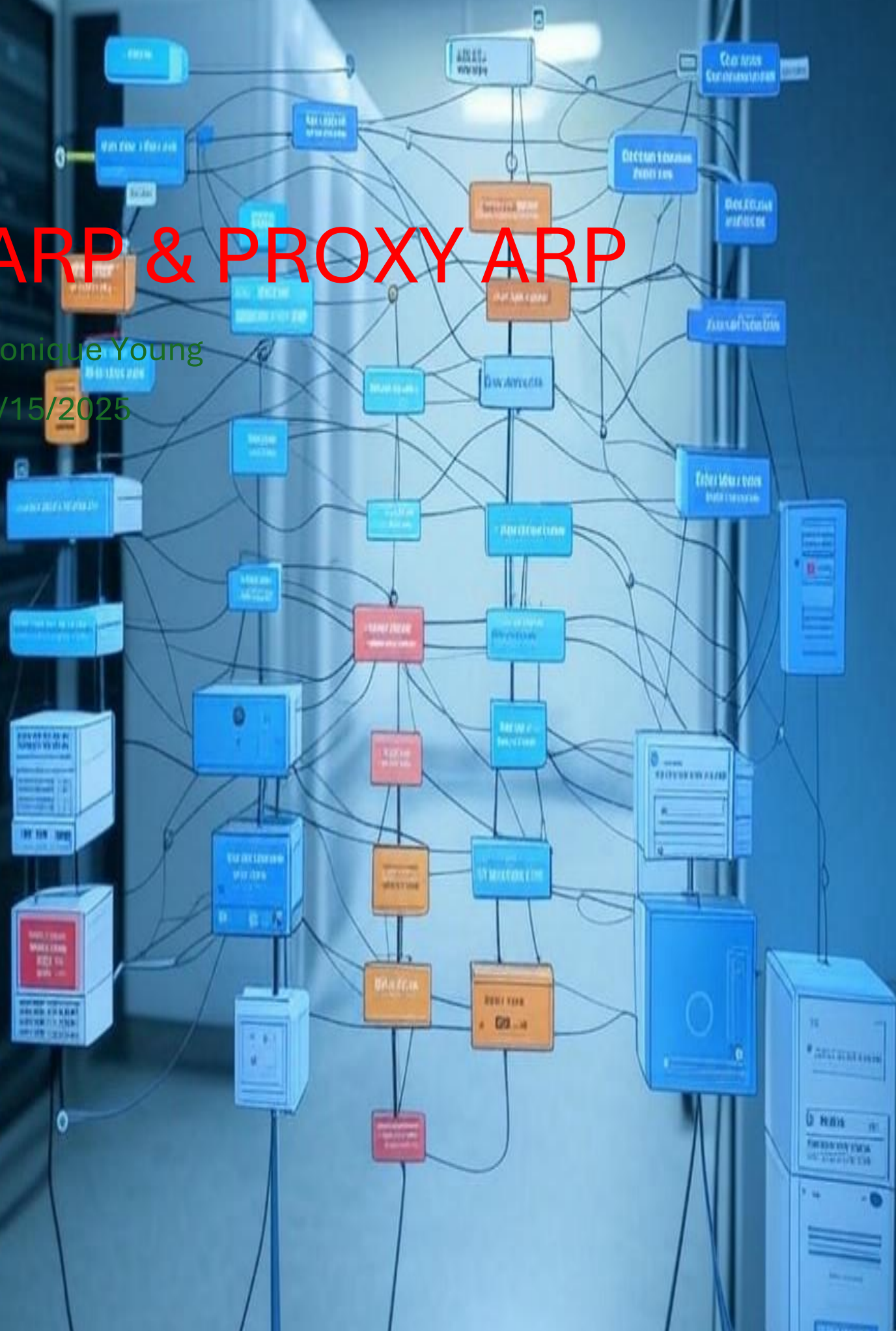


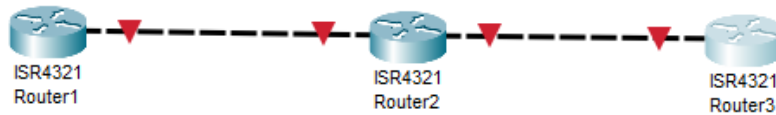
# ARP & PROXY ARP

Ronique Young

2/15/2025



## Project Overview: Network Configuration and Static Routing Implementation



For the above screen I have gone ahead and configured the hostnames these Cisco ISR4321 Routers.

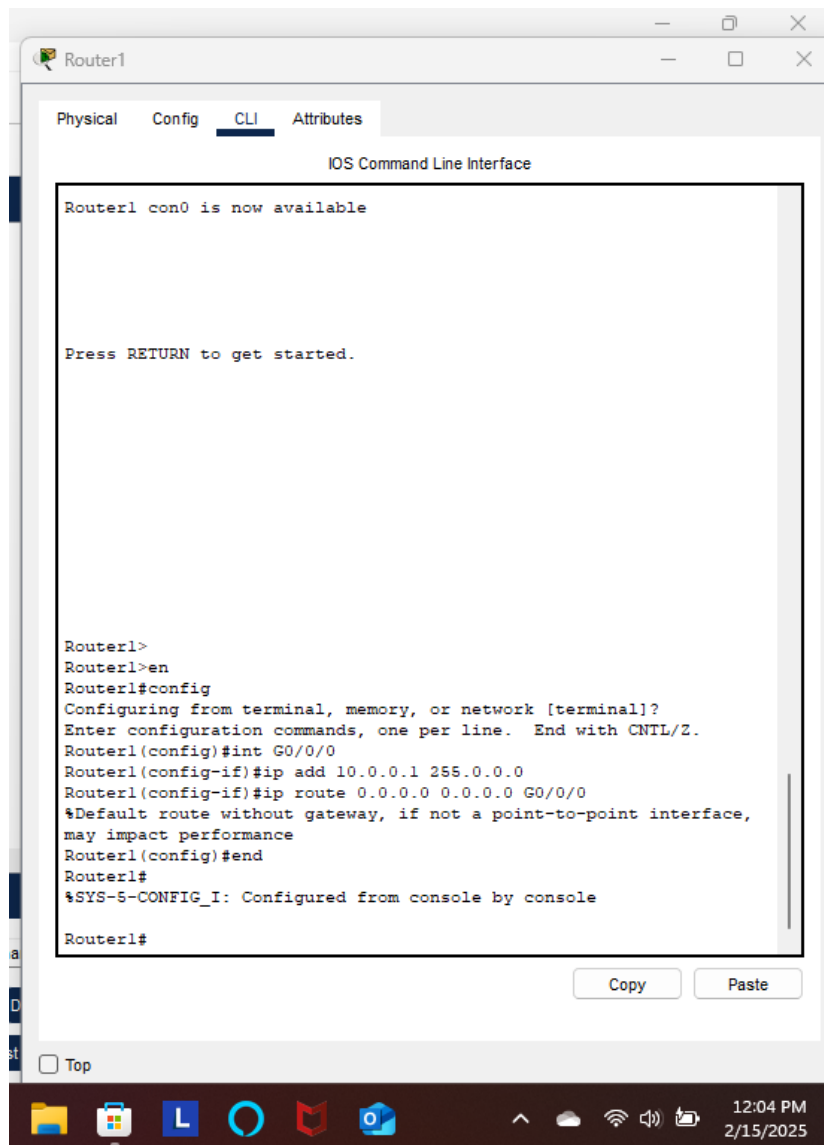
### Project Description:

I have conducted a comprehensive network setup involving three routers (R1, R2, R3), focusing on IP configuration on Ethernet interfaces, static route implementation, and ARP table analysis. This project highlights my skills in network configuration, routing, and troubleshooting.

### Key Tasks Accomplished:

IP Address Configuration:

Configured Ethernet interfaces with IP addresses according to the topology.



```
Router1 con0 is now available

Press RETURN to get started.

Router1>
Router1>en
Router1#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router1(config)#int G0/0/0
Router1(config-if)#ip add 10.0.0.1 255.0.0.0
Router1(config-if)#ip route 0.0.0.0 0.0.0.0 G0/0/0
%Default route without gateway, if not a point-to-point interface,
may impact performance
Router1(config)#end
Router1#
%SYS-S-CONFIG_I: Configured from console by console

Router1#
```

external traffic.

In this configuration, I entered the interface configuration mode for the Gigabit Ethernet interface G0/0/0 on Router R1. I then assigned an IP address of 10.0.0.1 with a subnet mask of 255.0.0.0, which places this interface in the 10.0.0.0/8 network. Following this, I activated the interface using the no shut command to ensure it was administratively up and ready for use. Finally, I configured a default static route to direct all traffic for which R1 does not have a specific route out through the G0/0/0 interface by using the command ip route 0.0.0.0 0.0.0.0 G0/0/0. This setup makes R1 send all unknown traffic through this interface, which could be beneficial if R1 serves as an edge router in a network environment directing

```
Router2>
Router2>EN
Router2#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router2(config)#int G0/0/0
Router2(config-if)#ip add 10.0.0.2 255.0.0.0
Router2(config-if)#no shut

Router2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state
to up

Router2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0/0, changed state to up

Router2(config-if)#int G0/0/1
Router2(config-if)#ip add 192.168.1.1 255.255.255.0
Router2(config-if)#no shut

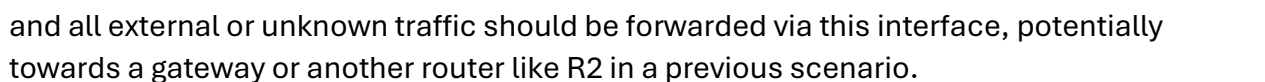
Router2(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/1, changed state
to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0/1, changed state to up

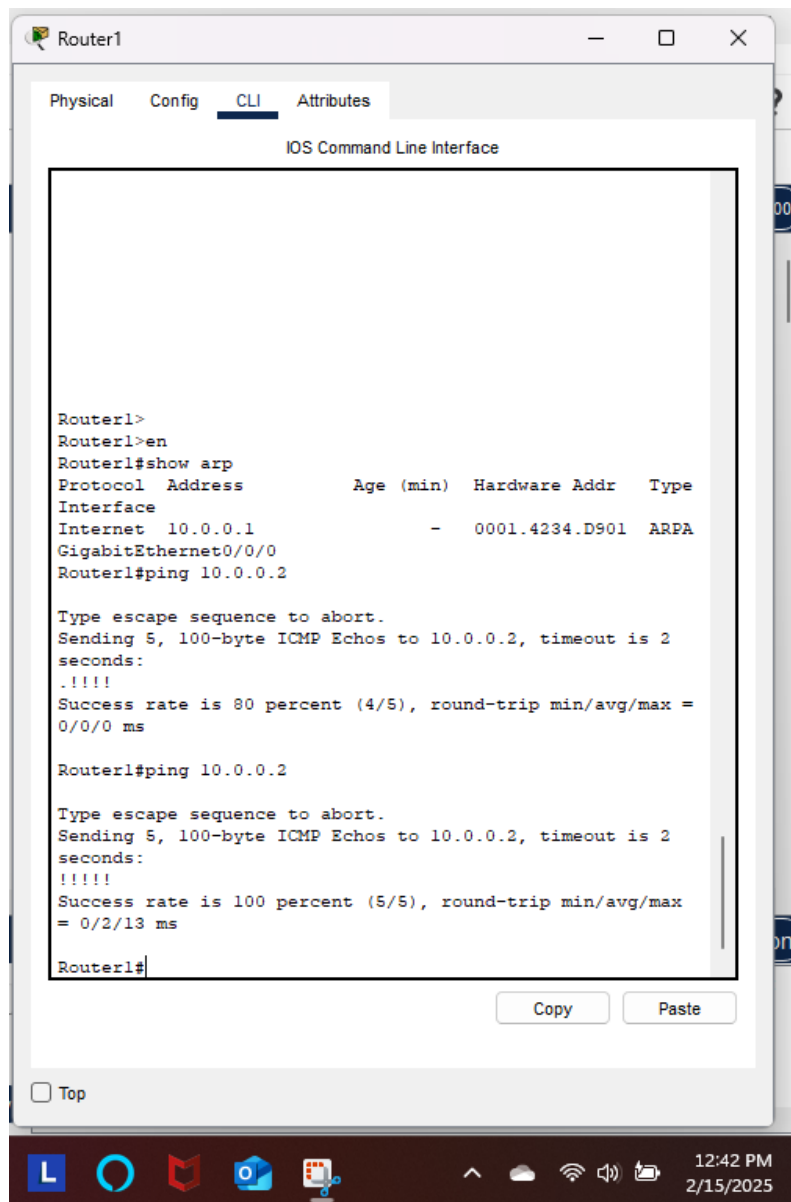
Router2(config-if)#
```

In this configuration, I entered the interface configuration mode for the Gigabit Ethernet interface G0/0/0 on Router R2. I assigned an IP address of 10.0.0.2 with a subnet mask of 255.0.0.0, placing this interface in the 10.0.0.0/8 network, and then activated it using the no shut command to ensure it was administratively up and operational. Next, I moved to configure the Gigabit Ethernet interface G0/0/1, assigning it an IP address of 192.168.1.1 with a subnet mask of 255.255.255.0,

which places it in the 192.168.1.0/24 network. This setup enables R2 to communicate on two different networks, with G0/0/0 likely connecting to a network shared with R1 (given the overlapping 10.0.0.0/8 subnet) and G0/0/1 connecting to a separate 192.168.1.0/24 network, potentially for another segment or device.



In this configuration, I entered the interface configuration mode for the Gigabit Ethernet interface G0/0/0 on Router R3. I assigned the IP address 192.168.1.2 with a subnet mask of 255.255.255.0, positioning this interface within 192.168.1.0/24 network. I then activated the interface with the no shut command to ensure it was administratively up and ready for use. Following this, I configured a default static route with ip route 0.0.0.0 0.0.0.0 G0/0/0, directing all traffic for which R3 does not have a specific route through the G0/0/0 interface. This setup suggests that R3 is part of a network segment where 192.168.1.0/24 is used,

The image shows a screenshot of a Cisco Router CLI window titled "Router1". The window has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" being the active tab. The title bar also says "IOS Command Line Interface". The CLI window contains the following text:

```
Router1>
Router1>en
Router1#show arp
Protocol Address      Age (min)  Hardware Addr  Type
Interface
Internet  10.0.0.1            -          0001.4234.D901  ARPA
GigabitEthernet0/0/0
Router1#ping 10.0.0.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.2, timeout is 2
seconds:
.!!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max =
0/0/0 ms

Router1#ping 10.0.0.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.2, timeout is 2
seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max
= 0/2/13 ms

Router1#
```

At the bottom of the window, there are "Copy" and "Paste" buttons. Below the CLI window, there is a "Top" button. The bottom of the image shows a Windows taskbar with various icons and a system clock showing 12:42 PM on 2/15/2025.

In this scenario, I first entered privileged EXEC mode on Router1 with the command `en` from user mode. I then displayed the ARP table using the `show arp` command, which revealed an entry for the IP address 10.0.0.1 associated with the MAC address 0001.4234.D901 on the GigabitEthernet0/0/0 interface. This entry had a dash '-' in the Age column, indicating a permanent or static ARP entry.

Next, I performed two ping tests to check the connectivity to the IP address 10.0.0.2. The first ping command resulted in a success rate of 80%, with one packet potentially lost or delayed, as indicated by the dot (.) for the first echo, followed by four successful replies (!!!!). The second ping command achieved a 100%

success rate, sending and receiving all five ICMP Echo packets. This shows that the network connectivity between Router1 and the device at 10.0.0.2 was stable, with the round-trip times for the pings ranging from 0 to 13 milliseconds, suggesting a low-latency connection.



## Technical Skills Demonstrated

### IP Configuration and Static Routing:

- Proficient in setting up IP addresses and managing static routes to ensure connectivity across different network segments.

### ARP and Network Troubleshooting:

- Skilled in using diagnostic commands to verify network configurations, particularly in understanding ARP cache dynamics.
- Network Simulation or Physical Implementation:
- Familiarity with setting up networks either in simulation environments or real-world scenarios.

## Project Availability

This project is documented and available for review on my [GitHub](#) profile, including configurations, topology diagrams, and command outputs.

### Contact for Collaboration:

Connect with me on [LinkedIn](#) for further discussion or collaboration opportunities in network infrastructure projects.

## Additional Notes

Network configurations like these are scalable for various enterprise environments, demonstrating both foundational and advanced networking skills.

I am eager to receive feedback and apply these skills to your networking challenges.